

**DETAILED ACTION**

***Election/Restrictions***

This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

The species are as follows:

Please elect one species from each group.

Group 1: A specific magnetic or metal precursor compound.

Group 2: A specific surfactant compound.

Group 3: A specific solvent compound.

Group 4: Single component nanoparticles or composite magnetic nanoparticles.

Applicant is required, in reply to this action, to elect a single species to which the claims shall be restricted if no generic claim is finally held to be allowable. The reply must also identify the claims readable on the elected species, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered non-responsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

The following claim(s) are generic: claim 1.

The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: The common technical feature of the species is the process of claim 1. However, the process as claimed is found in the prior art. Lee et al. (US 6572673) teaches adding a metal precursor to a surfactant, heating in the temperature range required by the claim, and centrifuging (separating) the metal oxide particles formed. See Example 1 of Lee. Thus, the common technical feature is not a special technical feature, and the species lack unity under PCT Rule 13.2.

During a telephone conversation with Paul Cha on 2/24/2010 a provisional election was made of iron (II) nitrate in Group 1; oleic acid in Group 2; octyl ether in Group 3; and iron oxide single component nanoparticles in group 4, the election encompasses claims 1-3, 13-14, 18-19, 24-31, and 33-34. Affirmation of this election must be made by applicant in replying to this Office action. Claims 4-12, 15-17, 20-23, 32, and 35 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claims 28 and 30-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Regarding claims 2, 13, 18, 31, and 34 the use of parentheses renders the claims indefinite because it is unclear whether the limitations included in the

parentheses are part of the claimed invention. See MPEP § 2173.05(d). A "wherein or the like" phrase could be used.

The use of "and" before "organic amine" in line 2 of claim 13 renders the Markush group improper. Also in claim 13, the use of "C<sub>n</sub>: hydrocarbon" renders the claim indefinite because it is unclear how the phrase limits the claim (C<sub>n</sub> does not represent an amine) and thus one of ordinary skill in the art would not be reasonably apprised of the scope of the claim.

Claim 28 recites the limitation "the magnetic oxide nanoparticles" in the first line of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 30 recites the limitation "the magnetic oxide nanoparticles" in the first line of the claim. There is insufficient antecedent basis for this limitation in the claim. Dependent claim 31 is rendered indefinite as a result.

It should also be noted that non-elected claim 32 has improper parentheses and that in non-elected claim 35, "BaSr<sub>x</sub>Ti<sub>1-x</sub>" does not have oxygen and is thus not a metal oxide as claimed in the preamble of the claim. The parentheses around " $(0 \leq x \leq 1)$ " render the claim indefinite and it is also unclear if " $(0 \leq x \leq 1)$ " applies to "BaSr<sub>x</sub>Ti<sub>1-x</sub>" or just "PbZr<sub>x</sub>Ti<sub>1-x</sub>".

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-3, 13-14, 18-19, 24-31, and 33-34 rejected under 35 U.S.C. 102(b) as being anticipated by WO'323.**

In regard to claim 1, WO'323 teaches a method of producing metal oxide and magnetic nanoparticles comprising adding a precursor or precursors to a solvent and surfactant, heating the solution at 30-500°C in order to obtain nanoparticles, and separating (retrieving by centrifuging etc.) the produced nanoparticles. See Figures 1 and 2 and the last paragraph on page 6 – the last full paragraph on page 9.

In regard to claims 2-3, WO'323 teaches the compounds listed including compounds of iron and nitrate. See pages 8-9.

In regard to claims 13-14, WO'323 teaches compounds of organic acids including oleic acid. See pages 8-9.

In regard to claims 18-19, WO'323 teaches solvents including ethers (such as octyl ether), organic acids (which are described as surfactants but are also considered solvents), and hydrocarbons. See pages 8-10.

In regard to claim 24, WO'323 teaches a molar ratio of precursor to surfactant of 1:0.1 - 1:100 (the surfactant is 0.1-100 times the amount of precursor. See the paragraph bridging pages 10-11 of WO'323.

In regard to claim 25, WO'323 teaches specific examples with the amount of solvent is in the range specified by the claims. For example in Embodiment 6 on pages

21-22, 0.2 mL of metal precursor is used with 7 mL of solvent (octyl ether) and thus the amount of solvent is 35 times the amount of metal precursor.

In regard to claims 26-27, WO'323 teaches reacting times of 1 minute to 24 hours (see the second full paragraph on page 13) and temperatures of 50-500°C (see the first full paragraph on page 12) and specific examples with reaction times in the range of the claims (e.g., 1 hour in Embodiment 6 on pages 21-22).

In regard to claims 28-29, WO'323 teaches that the size of the nanoparticles can be controlled by varying the precursor to surfactant ratio (and thus the concentration of the precursor and surfactant respectively). See the paragraph bridging pages 10-11.

In regard to claims 30-31 and 33-34, WO'323 teaches single component metal oxide (magnetic) nanoparticles including  $\text{Fe}_x\text{O}_y$ . See claims and Embodiment 6.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. ZIMMER whose telephone number is (571)270-3591. The examiner can normally be reached on Monday - Friday 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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